2x2ine

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zxzine

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ZXzine is published as a service to the Sinclair ZX81 community. Writers are invited to submit articles for publication. Readers are invited to submit article ideas.

Created using Open Source Tools:

- OpenOffice
- Scribus
- Gimp
- SZ81
- EightyOne

editorial

I've been a ZX81 user since the first was advertised in the United States and used it for a number of years, including using it as much as I could in my first two years of college. Eventually moved on to the QL, but still liked the ZX81. A few years ago, I had the programming itch and decided to do a little ZX81 assembly programming using emulators and cross assemblers. Since then I've touched on C with Z88dk. What I like about the ZX81 is that I don't have to spend any time worrying about the user interface or making the program pretty. I can concentrate on the algorithm.

As I work on projects, I like to write up what I am doing. There is no current newsletter or other publication for the ZX81. There is the ZX81 forums, but that is better suited for short write up and not long, multi-page writing. That is why I've decided to create ZXzine.

ZXzine is a free e-zine (electronic magazine). There is no costs to acquire it nor will there be any payment for authors. This whole project will cost only time, for both the reader and writer. If there are ZX81 vendors left, any that are interested in running an ad, it will be run at no cost.

ZXzine will be in a digital format. There will also be a .zip file that will include any code, .p files, or anything else that goes with the articles. No more typing in listings.

I am interested in getting feedback from the ZX81 community, both in what I'm doing wrong and what I'm doing right. Ideas for article is invited, along with articles themselves. The topics of articles can be anything that is ZX81 related. I'm hoping that the ZX81 community will find the e-zine interesting, entertaining and useful.

the zx80 and zx81 in the usa

Sinclair Research Limited

Before the launch of the ZX80, Clive Sinclair brought the ZX80 to the Las Vegas Consumer Electronic show. While traveling, Clive met Nigel Searle in Boston. Nigel had worked previously for Clive from 1973 to 1977. To get the ZX80 into the American market, Clive hired Nigel to run the US branch of Sinclair Research in Boston. Another employee of the US branch was David Ornstein, manager of Technical Services, who also wrote articles for the US magazine, SYNC. The mailing address for Sinclair (from advertisements) was 425 Main St. (P.O. Box 327), Wallingford, CT 06492, with the phone number of 617-367-1988.

The first personal computer for under $200.

The Sinclair ZX80.
A complete computer—only $199.95 *plus $5.00 shipping.*

Now, for just $199.95, you can get a complete, powerful, full-function computer, matching or surpassing other personal computers costing several times more.

It's the Sinclair ZX80, the computer that independent tests prove is faster than all previous personal computers. The computer that "Personal Computer World" gave 5 stars for 'excellent value.'

The ZX80 cuts away computer jargon and mystique. It takes you straight into BASIC, the most common, easy-to-use computer language.

You simply take it out of the box, connect it to your TV, and turn it on. And if you want, you can use an ordinary cassette recorder to store programs. With the manual in your hand, you'll be running programs in an hour. Within a week, you'll be writing complex programs with confidence.

All for under $200.

Sophisticated design makes the ZX80 easy to learn, easy to use.

We've packed the conventional computer onto fewer, more powerful LSI chips—including the Z80A microprocessor, the faster version of the famous Z80. This makes the ZX80 the world's first truly portable computer (6½" x 8½" x 1½" and a mere 12 oz.). The ZX80 also features a touch sensitive, wipe-clean keyboard and a 32-character by 24-line display.

Yet, with all this power, the ZX80 is easy to use, even for beginners.

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The ZX80 comes complete with its own 128-page guide to computing. The manual is perfect for both novice and expert. For every chapter of theory, there's a chapter of practice. So you learn by doing—not just by reading. It makes learning easy, exciting and enjoyable.

The ZX80's advanced design features.

Sinclair's 4K integer BASIC has performance features you'd expect only on much larger and more expensive computers. These include:

- Unique 'one touch' entry. Key words (RUN, PRINT, LIST, etc.) have their own single-key entry and are stored as a single character to reduce typing and save memory space.
- Automatic error detection. A cursor identifies errors immediately to prevent entering programs with faults.
- Powerful text editing facilities.
- Also programmable in machine code.
- Excellent string handling capability—up to 26 string variables of any length.
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- Built-in random number generator for games and simulations.

Sinclair's BASIC places no arbitrary restrictions on you—with many other flexible features, such as variable names of any length.

And the computer that can do so much for you now will do even more in the future. Options will include expansion of 1K user memory to 16K, a plug-in 8K floating-point BASIC chip, applications software, and other peripherals.

Order your ZX80 now!

The ZX80 is available only by mail from Sinclair, a leading manufacturer of consumer electronics worldwide. We've already sold tens of thousands of units in Europe, so demand will be great.

To order by mail, use the coupon below. But for fastest delivery, order by phone and charge to your Master Charge or VISA. The ZX80 is backed by a 30-day money-back guarantee, a 90-day limited warranty with a national service-by-mail facility, and extended service contracts are available for a minimal charge.

Price includes TV and cassette connectors, AC adaptor, and 128-page manual.

All you need to use your ZX80 is a standard TV (color or black and white). The ZX80 comes complete with connectors that easily hook up to the antenna terminals of your TV. Also included is a connector for a portable cassette recorder, if you choose to store programs. (You use an ordinary blank cassette.)

The ZX80 is a family learning aid. Children 10 and above will quickly understand the principles of computing—and have fun learning.

Phone orders only: (203) 265-9171. We'll refund the cost of your call.
Information: General and technical—(617) 367-1988, 367-1909, 367-1898, 367-2555. Phones open Monday-Friday from 8 AM to 8 PM EST.

sinclair

Sinclair Research Ltd., 475 Main St., P.O. Box 3027, Wallingford, CT 06492.

To: **Sinclair Research Ltd., 475 Main St., P.O. Box 3027, Wallingford, CT 06492.**
Please send me _____ ZX80 personal computer(s) at $199.95* each (US dollars), plus $5 shipping. (Your ZX80 may be tax deductible.)
I enclose a check/money order payable to Sinclair Research Ltd. for $_____
Name _____
Address _____
City _____ State _____ Zip _____
Occupation: _____ Age: _____
Intended use of ZX80: _____
Have you ever used a computer? ☐ Yes ☐ No.
Do you own another personal computer? ☐ Yes ☐ No. *For Conn. deliveries, add sales tax.
IA-12-0

DECEMBER 1980 INTERFACE AGE 59

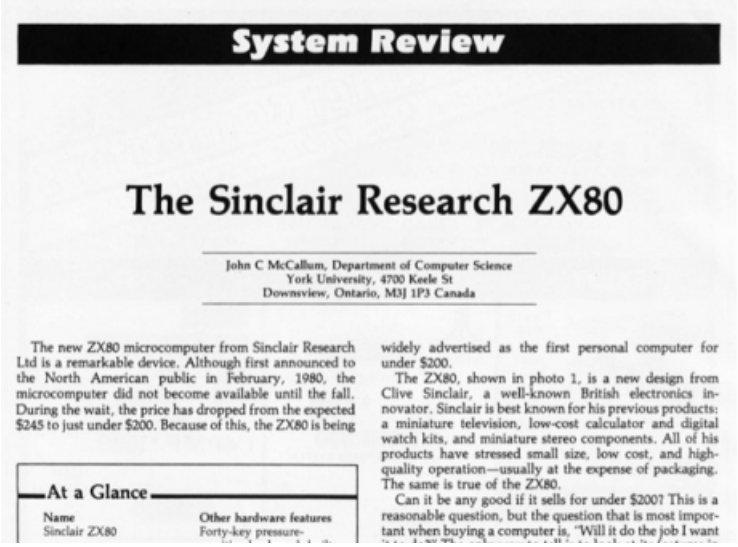
ZX80

The ZX80 was introduced to North America in February of 1980, same time as in the UK, but it was closer to the fall of 1980 when the computer was available.

Popular Mechanics mentioned the ZX80 in the October 1980 issue. Popular Science mentioned the computer in the November 1980 issue. In the December issue of both magazine was the first ZX80 advertisement from

Sinclair. The ZX80 was sold for $199.95 plus $5.00 for shipping. The first ad already mentioned a future 16K memory pack and 8K ROM.

BYTE magazine had a review of the ZX80 in the January 1981 issue, written by John C. McCallum, Department of Computer Science, York University, Ontario, Canada. The reviewer found that it was faster than the TRS-80 Model 1. He also liked the syntax checking when entering a line of BASIC. The article touch a lot on the "limits" of the ZX80, but the overall review was fairly positive, based a lot on the price of the ZX80.



System Review

The Sinclair Research ZX80

John C McCallum, Department of Computer Science
York University, 4700 Keele St
Downsview, Ontario, M3J 1P3 Canada

The new ZX80 microcomputer from Sinclair Research Ltd is a remarkable device. Although first announced to the North American public in February, 1980, the microcomputer did not become available until the fall. During the wait, the price has dropped from the expected $245 to just under $200. Because of this, the ZX80 is being widely advertised as the first personal computer for under $200.

The ZX80, shown in photo 1, is a new design from Clive Sinclair, a well-known British electronics innovator. Sinclair is best known for his previous products: a miniature television, low-cost calculator and digital watch kits, and miniature stereo components. All of his products have stressed small size, low cost, and high-quality operation—usually at the expense of packaging. The same is true of the ZX80.

Can it be any good if it sells for under $200? This is a reasonable question, but the question that is most important when buying a computer is, "Will it do the job I want

At a Glance

Name
Sinclair ZX80

Other hardware features
Forty-key pressure-

ZX80 Review in BTYE Magazine

Creative Computing, a popular microcomputer magazine, saw the potential in the ZX80 and started the magazine SYNC, with the January/February 1981 issue. A number of articles were written by the same author, David Lubar. The magazine had few advertisements, and the only US company that advertized for ZX80 software was Lamo-Lem of La Jolla, California. They advertised a cassette with Life, Lunar Lander, Mindmaster and K-Trek for $9.95. SYNC listed a number of user groups, but the only US one was The Harvard Group, who published the "SYNTAX ZX80" newsletter. The byline of SYNC was "The magazine for Sinclair ZX80 users." By the 4th issue, July/August 1981, the byline read "The magazine for Sinclair ZX80/1 users." The next issue the byline was changed to "The magazine for Sinclair users."

The Harvard Group started publishing SYNTAX ZX80 in two issues in late 1980. The newsletter ran for a number of years and also produced SQ - SYNTAX Quarterly.

ZX81

The ZX81 was announced in the UK in March 1981. Like the ZX80, it took awhile for the ZX81 to be marketed in the US. The official launch was on October 7, 1981 in Boston, with Sir Clive coming over for the announcement. The ZX81 was sold only by mail order. Sinclair struck a deal with American Express, so that their customers were the first to be offered the ZX81. At the time the U.S. office was located at 50 Stanford Street, Boston, MA 02114.

The first mention of the ZX81 was in the October 1981 edition of Popular Science, detailing the computer being on sale in the UK for about $150 and $110 for the 16K memory pack. The next issue of Popular Science had a two page ad for the ZX81. The left page advertized the complete ZX81 for $149.95, the kit version for $99.95, the 16K Memory Module for $99.95, and a set rate of $4.95 for shipping. The shipping address was One Sinclair Plaza, Nashua, NH 03061.

Smallest desk-top computer yet

LONDON, ENGLAND

Don't let the small size fool you. At just six by 6.5 by 1.5 inches, Sinclair's ZX81 is a complete desk-top computer. Attached to your TV set, the unit can create graphics—computer pictures—or solve problems with programs you have written using its built-in BASIC language.

In some ways, the ZX81 is a step down from the earlier ZX80 model [PS, May '80]; it's smaller and, at $150, it's less expensive. But it's a step up in capability. The machine has two software modes. Normally it can compute while displaying flicker-free graphics, permitting computer animation. In its second, "run," mode it can compute at four times the usual

ZIPPITY JACKET.
ZIPPITY VEST.
Buy any two Gabriel shocks or struts.

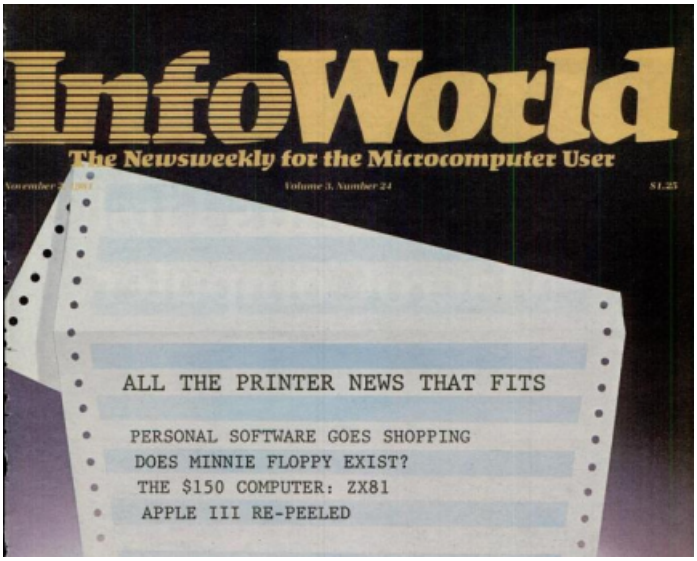
First mention of ZX81 in Popular Science

The November 2, 1981 issue of InfoWorld mentioned the ZX81 on the front cover and had the details of the October 7th announcement in the news section at the front of the issue. The news on the ZX81 announcement quoted Clive Sinclair as saying that "our market is the hobbyist; also a large volume of sales is to the man on the street.". At the time of the announcement, Sinclair said that it had 20,000 units in the US and hoped to sell that many in a month.

First Ad for ZX81 in Popular Science and Popular Mechanics

In the next issue of InfoWorld, there is another news article on the ZX81; "Sinclair Research has increased monthly production of it ZX81 microcomputer to 40,000 units from 20,000. The British-based company now produces more personal computers than any other manufacturer, including the United States market leaders Tandy Corporation and Apple Computers." The same article later says "In the first month 5,000 orders had been processed."

The November issue of Creative Computer had a review of the ZX81, written by David Tebbutt. Along with the review was an interesting set of pictures of the ZX81 with a chimpanzee. It was listed on the front cover as "A Sneak Preview of the Sinclair ZX81."



The November issue of SYNC also mentioned the launch of the ZX81. Since the 8K ROM was available for the ZX80, the issue had articles for both 4K and 8K systems.

As the popularity of the ZX81 took off, those that lived close to New Hampshire started coming to Nashau to see if they could purchase the computer without waiting for the post office to deliver it. The problem was that One Sinclair Plaza did not exist. It was a mailing address that only the Post Office knew about. One Sinclair Plaza was the location of the distribution company that Sinclair had contracted with to deal with mailing out the ZX81's.

The Nashua newspaper published an article on March 12, 1982, entitled "City officials solve mystery of 'Sinclair Plaza'". The real address was 141 Canal Street, the location of Direct Order Sales Corp. The article mentioned that Tim Litle, President of Direct Order Sales Corp., that there were some initial issues with sending out the ZX81. Apparently, Sinclair did not expect the high volume of orders that they received. They had no idea that the ZX81 had already received press coverage in the US.

Photographs with Creative Computing ZX81 Review

In the April issue of Byte magazine was an advertisement for a hard drive for the ZX81 with the following text:

"Responding to an obvious need for ZX81 owners for more data storage space, Hindsight Engineering has developed a 5-megabyte hard-disk system for the Sinclair ZX81. The system is available in either assembled or kit form. The kit includes instructions for building your own clean room for kit assembly. A DOS will be available. For pricing information and a catalog of other products, write to Hindsight Engineering, POB 107.5, Peanutbutter, NH, 03458."

For most, the town name of "Peanutbutter" was a give away that this was an April Fools joke.

Timex Corporation saw how many ZX81's Sinclair was selling, just using mail order. As the manufacturer of the ZX81, the had an in with Sinclair, They also had a large distribution channel in the United States. If Sinclair could sell so many ZX81's via mail order, imagine how many could be sold if there were carried in the same stores that carried the Timex watches.

In February of 1982, Timex created the Timex Computer Corporation to handle the ZX81. To highlight the joint venture, the new computer would have the "Timex/Sinclair" name. In July 1982, the Timex/Sinlcair 1000 was launched. It was identical to the ZX81 except that it had 2K internal memory instead of 1K on the ZX81. The initial price of the T/S 1000 was $99.95. Sinclair was still selling the ZX81 via mail order and they also dropped the price to $99.95. The kit version of the ZX81 was dropped to $79.95. There was no kit version of the T/S 1000 available. By early 1983, 600,000 units had been sold by Timex. The T/S 1000 was available in most drug stores, like Payless and Longs Drugs, and catalog stores like Consumer Distributing.

In July 1983, the Timex/Sinclair 1500 came available. It is a ZX81 inside a Spectrum case (with Spectrum type keyboard) with 16K internal and sold for $80. The T/S 1500 was designed by Timex of Portugal. It's main hardware difference was the use of a new ULA chip instead of the one built by Ferranti for the ZX81. The T/S 1500 solved the problem of the ram pack wobble, and addressed some issues of the membrane keyboard. Given that 1983 was the height of the home computer wars, it seems a little late for a system with no color or sound. The T/S 1500 was used by a company that created home-based computer learning kits. If you signed up for their computer course, you also got a T/S 1500 as part of the deal.

One Sinclair Plaza in 1982

One Sinclair Plaza today

Toward the end of the availability of the T/S 1000, the prices had dropped down to $50 and later to as low as $30 on discount. At that point the ZX81 was almost considered a joke by the larger US audience. The computer was still popular amongst the hobbyist crowd. Some saw the ZX81 as a cheap micro controller that spoke BASIC. Some liked it because getting over it's limitations was a bit a challenge, like a mountain that had to be climbed. Time Designs published articles on the ZX81 til the late 1980's. Update Magazine also carried some ZX81 articles in the early 1990's. There were a number of Timex/Sinclair user groups still existing in to the late 1990's that would occasionally published a ZX81 article if it same along.

Plotting with Z88dk

There are a number of ways to program on the ZX81; BASIC and Assembly. BASIC is easy but slow. Assembly is difficult but fast. Then Z88dk came along. Z88dk is a Small-C cross compiler that will run on a number of OS's (Windows, Linux, etc) and create ZX81 binaries. C is almost as easy as BASIC, but since it is compiled, it's fast. There is a little bit of overhead in the C runtime, but in general that should not be an issue.

One of the programs that I like write for different systems, requires a plotting points on the screen. Z88dk does not come with any PLOT or UNPLOT function, but it does come with a way to link C to assembly. I had worked with assembly and had a working PLOT and UNPLOT routine.

```
lplot:
        LD      HL,($4030)
        PUSH    HL
        LD      A,$98
        LD      ($4030),A
        CALL    PLOT
        POP     HL
        LD      ($4030),HL
        RET

uplot:
        LD      HL,($4030)
        PUSH    HL
        LD      A,$9E
        LD      ($4030),A
        CALL    PLOT
        POP     HL
        LD      ($4030),HL
        RET
```

All I had to do was to insert it into the C code and find the way to link the C to the assembly so that the value of X and Y to plot would be passed properly to the assembly code. Using an example that I found on the Z88dk forums, I put together a zx_plot routine. I wrote a test program, ran it and was happy that it worked. I then did some more testing and suddenly, the routine stopped working. I made adds to the code, not related to zx_plot, and that caused the system to crash.

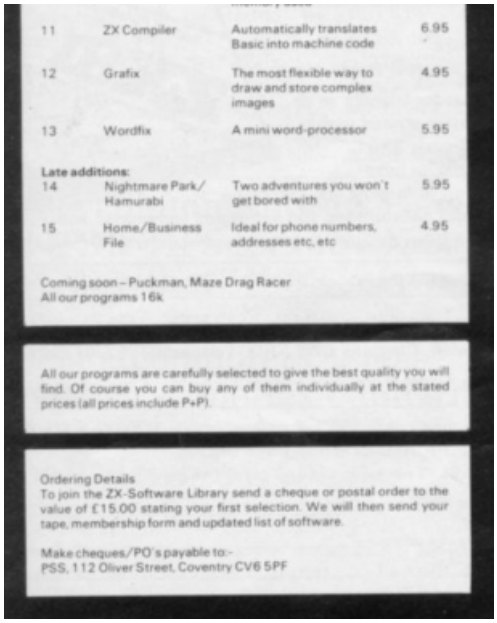
Stumped, I turned to the only resource available, the Z88dk forums. I posted my query and got a few good answers. Some of the answers did work some did. The user Siggi, provided an example that worked. The user Timmy provided an example that did generate an error, until the user Alvin came along and fixed it. The final answer from Timmy and Alvin was optimized over Siggi's example. It was faster (45 cycles vs 96 cycles) and shorter (5 bytes vs 18 bytes).

```
static void __CALLEE__ zx_plot( short x, short y)
{
   #asm

   POP      HL    ; HL = return address
   POP      DE    ; E  = y,  and  remove y from stack
   POP      BC    ; C  = x,  and  remove x from stack
   PUSH     HL          ; push return address back to stack
   LD B, E  ; BC = yx
   LD HL,(TADDR)
   PUSH     HL
   LD A, $98
   LD (TADDR), A
   CALL     PLOT
   POP      HL
   LD (TADDR), HL
   RET
   #endasm
}
```

The final code in zxplot.c has two functions: zx_plot and zx_unplot. I named to be similar to the zx_ functions already in the zx81.h header file. Both functions take an argument of a X and Y, both being short int. There is no error checking to see if X or Y are out of range, so beware.

ZX81 Basic Compilers

BASIC as an interpreted language is slow and on the ZX81, with slow mode, it is especially slow. To get speed on the ZX81, the usual option was to write in assembly language. Assembly language is a harder language to learn and more difficult to program in and to debug. Eventually, the idea of a BASIC compiler came along. This article will provide a history of the different ZX81 BASIC compilers that were advertized in the different magazines.



The first compiler advertized was ZX Autocoder, produced by Control Technology of Hyde, Cheshire, UK, in the April 1982 issue of Sinclair User. The compiler sold for 6.95 pounds "including cassette and manual." They ran a few more ads, but by the end of 1982, no more ads were running.

In the June, 1982, issue of Sinclair User, PSS of Coventry, ran an add for "ZX Compiler," for 6.95 pounds. By September , 1982, PSS had bundled the compiler with "Enhanced-Basic" as the Programmers Pack #1 for 4.95 pounds. The November, 1982, issue of Sinclair User, Silversoft was advertising a "ZX81 Compiler", selling for 5.95 pounds.

In the January, 1983 issue of Sinclair User, PSS ran their first advertizement in the UK for their renamed compiler, MCODER. Selling for 7.95 pounds.

In a series of articles for "Your Computer" magazine, David Threlfall, the author of MCODER, wrote about creating a BASIC compiler and provided a hex listing for the compiler. If the reader was not interested in typing in all of the hex code, the compiler was available via mail order for 8.95 pounds. The series ran from July to September 1983. The compiler was given the name ZXGT and it was 2.3K long.

In the August, 1983, issue of Your Computer, PSS ran an add for the new MCODER II, at a cost of 8.95 pounds. The same advertizement listed MCODER II for the Spectrum.

In the United States, all ZX81 products take time to come across the pond, and this included compilers. In the Nov/Dec. 1982, issue of SYNC , there were two compilers advertized. One was by Non Trivial Solutions of Amarillo, Texas. Their compiler was called ZXpress and was sold for $29.95. This was only advertized once in SYNC. The other was PSS advertizing MCODER, which is a renaming of their earlier compiler. It was listed for 7.95 pounds. All though the PSS advertisement was in a US magazine, the mailing address was for the UK and the pricing was in pounds sterling.

In the March/April 1983 issue of SYNC, there is an ad for "The ZX Compiler" from Bob Berch of Rochester, New York, for $25.00. Bob Berch was also known for writing his own assembler and disassembler programs. In the May/June 1983 issue of SYNC, Kopak Creations of Union City, New Jersey, advertized "Z-99 Compiler" for $19.95. In the July/Aug 1983 issue of SYNC, Data-Assette of Oxford, PA, ran an ad for "ZX-Compiler" for $24.95.

There is very little known about any of the compilers listed from the US vendors. Some of the vendors, like Data-Assette, could have been reselling the compilers from the UK, or they could have written their own.

MCODER II and the Silversoft compilers are the only ones available from the different ZX81 online archives, with MCODER II the only one where documentation is available.

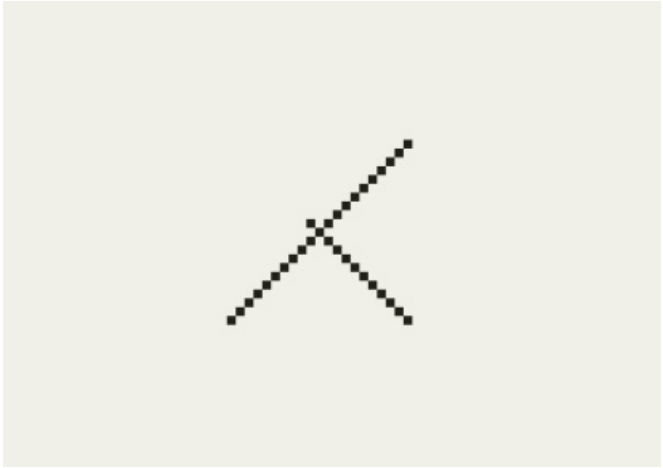
Drawing a Line

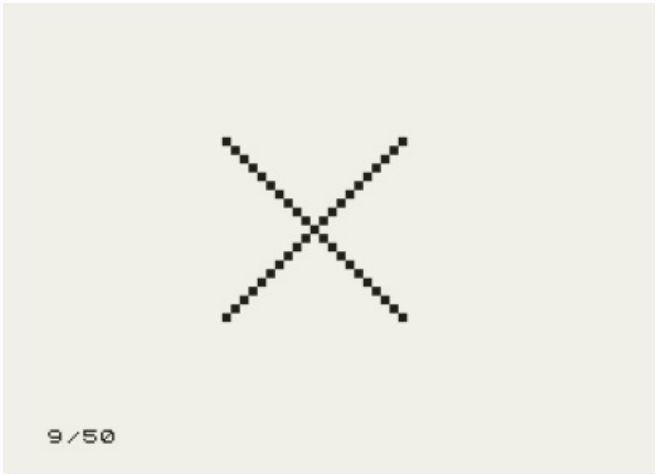
Despite it been almost 30 years since I had my computer graphics class in college, I still recall a number of the graphics algorithms that were covered in the class. The hardware in the graphics lab was a CP/M system that used Turbo Pascal as the language for the class. By 1987, I had moved on from the ZX81 and T/S 2068 to the QL. I did port some of my classwork to the QL, but I really had not thought about trying them on the ZX81. When I got back into the ZX81 a few years back, I decided to work on some graphics programs, starting with some of the algorithms I learned in the class.

```
@line:
   let dx = abs(xx2 - xx1)
   let dy = abs(yy2 - yy1)
   if xx1 < xx2 then let sx = 1
   if xx1 >= xx2 then let sx = -1
   if yy1 < yy2 then let sy = 1
   if yy1 >= yy2 then let sy = -1
   let err = dx-dy

@lineloop:
   plot xx1,yy1
   if xx1 = xx2 and yy1 = yy2 then goto @lineend
   let e2 = 2*err
   if e2 > -dy then let err = err - dy
   if e2 > -dy then let xx1 = xx1 + sx

   if xx1 = xx2 and yy1 = yy2 then plot xx1,yy1
   if xx1 = xx2 and yy1 = yy2 then goto @lineend

   if e2 < dx then let err = err + dx
   if e2 < dx then let yy1 = yy1 + sy

   goto @lineloop
@lineend:
   return
```

Drawing a line sounds like simple thing to do, but a line can move up, down, left or right from the point of origin, making the math a little more complex. In 1962, Jack Bresenham from IBM, came up with a simple and elegant algorithm that makes any line a simple process. The issue is to determine slope and use that to draw pixels from point A to point B. One key feature is that it only needs integer math and only a few instances of multiplication, making it an easy algorithm to implement. The algorithm was presented in 1963 at the ACM annual meeting and published in IBM Systems Journal in 1965.

I've written two version of the program, one for BASIC and one for C (z88dk). Both of them draw lines from a center point to a point in each of the four quadrants. This shows that the algorithm can draw lines forwards, backwards, up and down. The BASIC version is slow enough to see how the algorithm works. The C version is a bit faster.





Astronomical Algorithms on the ZX81

In high school, when I was planning for college, I thought I would get a degree in Astronomy. One of the first things I bought with the funds from my first job was a 6-inch Newtonian telescope. I had even join the Astronomy Book of the Month club. Despite getting a degree in Computer Science, I have always been interested in Astronomy.

A while back I typed in a number of the programs from the book "More Uses for Your Timex/Sinclair 1000: Astronomy on Your Computer" by Eric & Howard Burgess. The programs were interesting, but they did not explain the calculations or algorithms used. The key book for that is "Astronomical Formulae for Calculators", fourth edition, by Jean Meeus. The first edition was published in 1982 and the fourth in 1988. The

follow in book is "Astronomical Algorithms" by Jean Meeus. I have both books and found the first book to be smaller, cheaper and has most of the same details as the second.

The code for each routine is written as closely to the algorithm/calculation in the book. The same variable names are used so that it is easy to read the book and follow exactly what the code is doing. All of the programs have been written to be used with zxtext2p, the tool that takes a text file with ZX81 code and converts it into a .P file.

Gregorian Date to Julian Date

A Julian Date is the number of days since January 1, 4713 BC. Julian dates are used in Astronomical calculation because it does not have to worry about years, months or days. A Gregorian Date is the day, month, year that we all currently use, from the Gregorian Calendar. The program will take a day, month, and year and convert it to the Julian Date.

Julian Date to Gregorian Date

This program will take the Julian Date and convert it to a Gregorian Date. Since most of us think in day, month, year, and astronomical calculations are easier done in Julian Date, these two routines are needed for the other programs.

Date of Easter

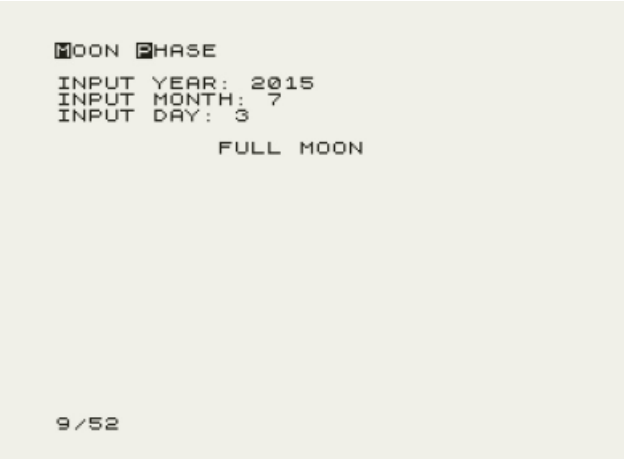
The date of Easter has been important to the Catholic Church for almost two thousand years. The date of Easter is defined as "the Sunday following the full moon that follows the northern spring equinox."

Day of Week

Another important calculation is the day of the week when given a Gregorian date. If you want to know what day of the week you were born, this program can calculate that.

Phase of Moon

The moon is the largest celestial object in the sky. Everyone sees it, but do they really see it. How many know what the current phase it? This program will give one of four phases of the moon for any given date. The calculation is based on the fact that the lunar cycle is 29.53058868 days. With a known full moon date, determining the number of



days from that date to the given date, and then dividing by 29.53058868 days, quickly determines the phase.

Dates of Solstices and Equinox's

A Solstice is the greatest north or south distance that the Sun will progress. It happens in the Summer and Winter. An Equinox is when the Sun is directly above the equator. This happens in the Spring and Fall. The start of each season is based on either a solstice or equinox. This program will determine the day of each solstice and equinox.

Positions of Jupiter Moons

The Galilean moons of Jupiter are the 4 that Galileo discovered in 1610, Io, Europa, Ganymede, and Callisto. Using telescope or binoculars, it is fairly easy to make out the 4 moons orbiting around Jupiter. Because they are fairly easy to see with low power optics, they are a common set of objects for beginning stargazers to observe. The moon orbit Jupiter fast enough that the positions change pretty much nightly. This program will calculate the positions of the moons, in relation to Jupiter, on any given date.

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POSITIONS OF JUPITERS MOONS

INPUT YEAR: 2015
INPUT MONTH: 7
INPUT DAY: 3

DISTANCE FROM MOONS TO JUPITER
   (IN JUPITER RADIANS)

IO       = 5.7695555
EUROPA   = -3.05662
GANYMEDE = 2.7223533
CALLISTO = -9.826149


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MicroSync Services

MicroSync of Keene, New Hamphire, was a company set to repair Sinclair ZX81's and Timex/Sinclair 1000's. They were "Sinclair's Exclusive Authorized Service Center" and dealt with Sinclair computers in the United States and Canada.

They offered a maintenance contract on the computers, memory pack, and printers. They repaired the ZX printer, which was not sold in the US, but was sold in Canada. If the computer was under 90 days old, the contract was $14.95. Same for the memory pack and $16.95 for the ZX printer. Purchase of the contract after the initial 90 says, the price went way up. The computer and memory pack was $34.95, and 39.95 for the ZX printer. These prices were from September 1982. By April 1983, the price of the memory pack had dropped to $12.95 if newer than 90 days, and 29.95 after that.

The fine print on the ads said that "kits or modified units might require a surcharge. Microsync may not repair units damaged by abuse or negligence." I can imagine the mangling done by some kit builders.

In 1982, MicroSync reported that it had repaired 10,000 ZX81's.

Given that the T/S 1000 was selling for $100, $35 seems awfully steep for a maintenance contract. When the price of the T/S 1000 dropped to $50 or less, it would be faster to just go down a buy another system before they sold out on the clearance rack.